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Empirical Study of Disaster Management Resource System: Analysis of Perception Difference between Disaster Management Administrative Officials and Firefighters[1]

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A B S T R A C T

The purpose of this study is to derive perception differences between disaster management administrative officials and firefighters in disaster management resources system. In order to achieve this research purpose, we surveyed the perception of disaster management resources between local government disaster management administrative officials and firefighters, and difference analysis was conducted through the SPSS program. As a result of this study, it was found that the two groups had similar perceptions in terms of the possibility of disaster damage and the needs for disaster management resources. And there are differences on cooperation factors and the effectiveness of the disaster management resource system between two groups, and local government disaster management administrative officials have a relatively positive perception than firefighters. Therefore, it's necessary to consider the perception and opinion of various participating departments in disaster management resources system, including local government disaster management administrative officials and firefighters when formulating plans in the future.

Key words: disaster management resources system, perception difference, administrative officials, firefighters

1. Introduction

Disasters show a trend of compounding, large-scale and extensive. Disaster management means the comprehensive efforts to prevent and mitigate disasters in advance to minimize damages and recover from the damage to the level before the disaster occurred (Kim, *et. al*., 2022: 10). When a disaster occurs, the scale of losses will be affected according to the preparedness and response of the disaster management system. Therefore, disaster management resources play an indispensable and important role in disaster response. However, due to the inconsistent concepts and terms of disaster management resource system in laws and regulations, lack of detailed terms of cooperation and specialized organizations and staff, and the imperfect implementation of disaster managers, the operation of disaster managers is affected (National Disaster Management Research Institute, 2020:75-125; Kim, *et. al*., 2020: 160-162; Seoul Institute of Technology, 2022:113). When a disaster occurs, not only the victims of the disaster, but also the public departments such as the central government, local governments, army, police, fire officer, volunteers, society organizations and other private departments and enterprise departments invested in disaster response, rescue and recovery (Yoo, *et. al*., 2008: 224-236). Many departments are also involved in the support process of disaster management resources system, includes the Ministry of the Interior and Safety, related central departments, public administrative organizations, enterprises and other departments. These departments play different roles and operations. Therefore, it is necessary to analysis the perception differences between the participating departments in the process of disaster management resources system.

This study analyzed the perception difference between local government disaster management administrative officials and firefighters in disaster management resources system.

2. Literature Review

[1] This study is a partial revision and supplementation of Dr. An's Ph.D. Dissertation.

2.1 Disaster Management Resource Operations

Disaster management resources exist as an essential part of the disaster response process. When approaching from this opinion, it is necessary to analyze the system of disaster management resources according to the composition of the disaster management system.

According to the Article 34 of Framework Act on the Management of Disasters and Safety, disaster management resources mean the equipment, commodities, materials and facilities prescribed by Presidential Decree which are necessary for disaster management activities. This law also defines the content of resources management operations, including three major parts: classification and management, connection and support, and settlement and evaluation. For details, please refer to Table 1 below.

<Table 1> Details of Resources Management Operations

Operations	Details
classification and management	classification and selection investigation standardization management
connection and support	contact collect, investigate and register ensure and reserve support
settlement and evaluation	settlement post event management (Supplement) education and training inspection and evaluation

※ Source: Disaster Resources Sharing Standard

2.2 Disaster Management Resource Operations Organizations

According to the roles of disaster management resources operation organizations are divided into three: Ministry of the Interior and Safety, coordinating department, and support organizations.

① Ministry of the Interior and Safety(MOIS)

The MOIS is responsible for coordinating and adjusting the disaster management resources for the disaster response and recovery, and formulating the classification standards, coding standards, investigation and registration, and other details of disaster management resources.

② Coordinating department

The coordinating department refers to the Central Disaster Safety Countermeasures Headquarters (CDSCH) that play the role of coordinating organizations in order to effectively deal with large-scale disaster management.

③ Support organizations.

Support organizations refer to disaster management responsible agencies or non-governmental organizations that have disaster management resources, needed to support the operations of MOIS and CDSCH. Disaster management responsible agencies include the central governmental departments like the Ministry of Science and ICT(MSIT), the Ministry of National Defense, the Ministry of Agriculture, and so on. Non-governmental organizations include the Korean Red Cross and the National Disaster Relief Association and so on.

2.3 Role of Local Government Disaster Management Administrative Officials and Firefighters

The MOIS is responsible for coordinating and adjusting the disaster management resources activities at the government level. Therefore, local government disaster management administrative officials play a coordinating and adjusting role for disaster management resources activities in local regions and manage the regional materials, equipment and manpower, and stipulates by Disaster Resources Sharing System (DRSS), update the information of resources status every month.

When a disaster occurs, the firefighters will put into the disaster site for response activities. In the disasters like fire, earthquake, firefighters protect the lives and property of citizens through rescue and first aid activities (Chae, 2009: 71). So viewing the characteristics of fire-fighting work from the perspective of disaster management resources, all fire-fighting equipment invested in disaster response activities belong to the scope of disaster managers resources. In other words, it is also necessary to consider fire-fighting equipment as a part of disaster management resources.

2.4 Previous Studies Review

In the process of disaster management activities, disaster management resources exist as an essential part. When approaching from this point of view, it is necessary to conduct disaster management resource activities in accordance with the composition of the disaster management system. As a result of reviewing previous studies on the disaster management system, most of the studies conduct by integrating parts such as disaster management laws, organizations, cooperation, and information systems into components of the disaster management system (Park, 1997; Kwon, 2003; Choi, 2005; Kim, 2005; Moe & Pathranarakul, 2006; Lee, 2007; Kang,

2007; Lee, *et. al.*, 2009; Lim, 2015; Lee & Shim, 2015; Byun, 2018).

3. Empirical Analysis

3.1 Survey Targets and Descriptive Statistics

The targets of this survey were local government disaster management administrative officials and firefighters, and the survey was conducted through online and visits. The number of local government disaster management administrative officials(public servants) is 121 and the number of firefighters(fire officers) is 188. A total of 309 questionnaires were used as analysis data.

In order to analyze the differences between local government disaster management administrative officials and firefighters, this study analyzed the data by frequency analysis and t-test through SPSS program.

And the descriptive statistics of survey participants are shown in <Table 2>.

<Table 2> Descriptive Statistics of Survey Participants

(N = 121, 188)

Characteristics		Administrative Officials (%)	Firefighetrs (%)
Sex	Male	93(76.9)	162(86.2)
	Female	28(23.1)	26(13.8)
	Total	121(100)	188(100)
Disaster response experience	Yes	89(73.6)	165(87.8)
	No	32(26.4)	23(12.2)
	Total	121(100)	188(100)
Ultimately education	High school graduates and below	10(8.3)	26(13.8)
	College	16(13.2)	51(27.1)
	University	92(76)	102(54.3)
	Graduate school	3(2.5)	9(4.8)
	Total	121(100)	188(100)
Length of public office	3years below	29(24)	38(20.2)
	4years~5years below	8(6.6)	28(14.9)
	5years~7years below	14(11.6)	8(4.3)
	7years~10years below	13(10.7)	14(7.4)
	10years~15years below	16(13.2)	43(22.9)
	More than 15years	41(33.9)	57(30.3)
	Total	121(100)	188(100)
Length of disaster office	1year below	34(28.1)	25(13.3)
	1year~2years below	41(33.9)	19(10.1)
	2years~3years below	17(14)	26(13.8)
	3years~4years below	3(2.5)	8(4.3)
	4years~5years below	3(2.5)	16(8.5)
	More than 5years	23(19)	94(50)
	Total	121(100)	188(100)

3.2 Results

3.2.1 Perception Differences on the Disaster Possibility and Resources Needs

Among the types of natural disasters with the greatest possibility of disaster losses in the work area, 38(31.4%) for rainstorm, 37(30.6%) for typhoon, and 18(14.9%) for flood are choose by the local government disaster management administrative officials. And 58(30.9%) for typhoon, 55(29.3%) for rainstorm, and 30(16.0%) for flood are chosen by the firefighters (<Figure 1>).

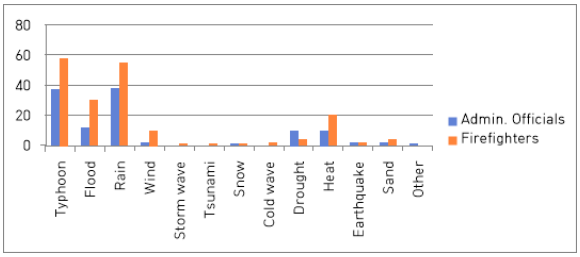

Figure 1. Perception of Natural Disaster Possibility

Among the most needed type of resources in natural disaster occurs, 42(34.7%) for facilities emergency recovery, 26(21.5%) for emergency life stability support, and 17(14.0%) for rescue are choose by the local government disaster management administrative officials. And 74(39.4%) for rescue, 33(17.6%) for emergency life stability support, and 27(14.4%) for facilities emergency recovery are choose by the firefighters (<Figure 2>).

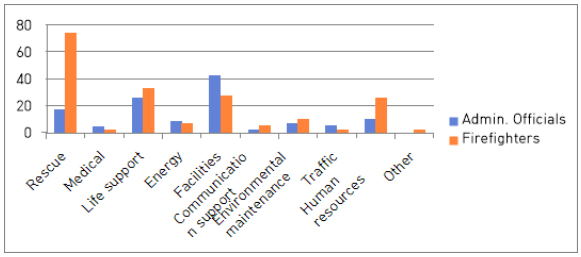

Figure 2. Perception of Resources Needs in Natural Disasters

Among the types of man-made disasters with the greatest possibility of disaster losses in the work area, 79(65.3%) for fire, 12(9.9%) for infectious diseases, and 10(8.3%) for traffic accident are chosen by the local government disaster management administrative officials. And 105(55.9%) for fire, 55(29.3%) for traffic accident, and 11(5.9%) for infectious diseases are chosen by the firefighters (<Figure 3>).

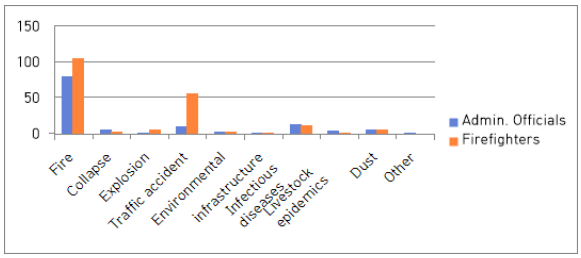

Figure 3. Perception of Man-made Disaster Possibility

Among the most needed type of resources in man-made disaster occurs, 76(62.8%) for rescue, 11(9.1%) for medical, and 8(6.6%) for emergency life stability support by the local government disaster management administrative officials. And 131(69.7%) for rescue, 22(11.7%) for human resources, and 8(4.3%) for facilities emergency recovery are chosen by the firefighters (<Figure 4>).

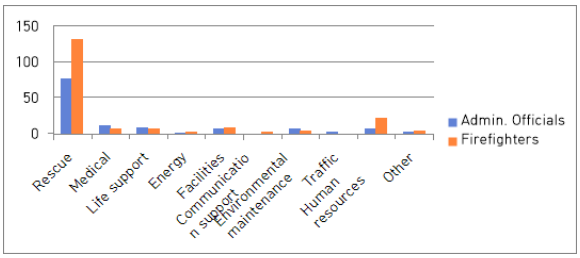

Figure 4. Perception of Resources Needs in Man-mad Disasters

3.2.2 Perception Differences on the Factors and Effectiveness of Disaster Management Resources System

This study used the independent-sample t-test to analysis the perception differences on the factors and effectiveness of disaster management resources system between local government disaster management administrative officials and firefighters.

The results(<Table 3>) show that for all factors, local government disaster management administrative officials answer positively than firefighters on average. There were significant differences in the cooperative factors (t=2.852, p<0.01) and effectiveness (t=3.399, p<0.001).

Table 3. Perception Differences on Factors and Effectiveness

Classification		N	Mean	Std. Deviation	t	sig
Law and Regulation	Admin. Officials	121	3.5537	.84935	1.205	0.229
	Firefighters	188	3.4379	.80789		
Organization	Admin. Officials	121	3.1787	.64868	1.163	0.246
	Firefighters	188	3.0824	.74711		
Cooperation	Admin. Officials	121	3.3326	.75855	2.852	0.005**
	Firefighters	188	3.0638	.83932		
Continuity of Operation	Admin. Officials	121	3.2744	.81696	1.569	0.118
	Firefighters	188	3.1213	.85040		
Effectiveness	Admin. Officials	121	3.4432	.72385	3.399	0.000***
	Firefighters	188	3.1283	.83722		

*p<0.05, **p<0.01, ***p<0.001

There are significant perception differences in the sub-variable of organizational factors, leadership competence of the general manager(t=3.618, p<0.001), task execution degree of command tower(t=2.865, p<0.01), the sub-variable of cooperation factors, coordination department capability(t=2.310, p<0.05), communication(t=3.055, p<0.01), communication system(t=2.456, p<0.05), resources sharing(t=2.363, p<0.05), the sub-variable of continuity of operation factors, education and training(t=1.968, p<0.05), improvements of plan(t=2.105, p<0.05), the sub-variable of effectiveness, sufficient of response resource(t=3.567, p<0.001), rapid of response resource support(t=2.437, p<0.05), systematic of response support(t=3.426, p<0.001), matching of response resources needs(t=3.124, p<0.01), rapid of recovery resource support(t=2.746, p<0.01), systematic of recovery support(t=2.827, p<0.01), matching of recovery resources needs(t=3.526, p<0.001). The results are shown in <Table 4>.

Table 4. Perception Differences on sub-variable of Factors and Effectiveness

Classification		N	Mean	Std. Deviation	t	sig
leadership competence of the general manager	Admin. Officials	121	3.37	0.838	3.618	0.000***
	Firefighters	188	2.96	1.046		
task execution degree of command tower	Admin. Officials	121	3.31	0.921	2.865	0.004**
	Firefighters	188	2.99	0.965		
coordination department capability	Admin. Officials	121	3.41	0.910	2.310	0.022*
	Firefighters	188	3.16	0.930		
communication	Admin. Officials	121	3.36	0.856	3.055	0.002**
	Firefighters	188	3.04	0.930		
communication system	Admin. Officials	121	3.31	0.825	2.456	0.015*
	Firefighters	188	3.05	0.918		
resources sharing	Admin. Officials	121	3.25	0.869	2.363	0.019*
	Firefighters	188	2.99	0.951		
education and training	Admin. Officials	121	3.35	0.955	1.968	0.050*
	Firefighters	188	3.12	1.033		
improvements of plan	Admin. Officials	121	3.30	0.963	2.105	0.036*
	Firefighters	188	3.06	0.946		
sufficient of response resource	Admin. Officials	121	3.42	0.824	3.567	0.000***
	Firefighters	188	3.04	0.983		
rapid of response resource support	Admin. Officials	121	3.52	0.838	2.437	0.015*
	Firefighters	188	3.26	0.991		
systematic of response support	Admin. Officials	121	3.52	0.857	3.426	0.000***
	Firefighters	188	3.15	0.975		
matching of response resources needs	Admin. Officials	121	3.40	0.881	3.124	0.002**
	Firefighters	188	3.05	1.017		

rapid of recovery resource support	Admin. Officials	121	3.52	0.838	2.746	0.006**
	Firefighters	188	3.22	0.983		
systematic of recovery support	Admin. Officials	121	3.45	0.866	2.827	0.005**
	Firefighters	188	3.14	0.951		
matching of recovery resources needs	Admin. Officials	121	3.40	0.802	3.526	0.000***
	Firefighters	188	3.04	0.930		

*p<0.05, **p<0.01, ***p<0.001

4. Conclusion

Perception of the possibility of natural disasters, both two groups chose floods, typhoons and rains as top 3. When these natural disasters occur, the most needed resources types are facilities emergency recovery, emergency life stability support, and rescue. Perception of the possibility of man-made disasters, both two groups chose fire, infectious diseases and traffic accidents as Top 3. When these man-made disasters occur, the most needed resources type is rescue. These analysis results verify that there is not much perception difference on the possibility of disasters and needs of disaster between local government disaster management administrative officials and firefighters.

The analysis results show that there are perception differences on the factors and effectiveness on the disaster management resources system between local government disaster management administrative officials(public servants) and firefighters(fire officers). Because there are differences in the roles and operations of the two groups in disaster management resources system. In other words, disaster management administrative officials are responsible for overall planning and coordination, and firefighters are involved in the scene of the disaster and responsible for rescue.

Therefore, it's necessary to consider the perception and opinion of various participating departments in disaster management resources system, including local government disaster management administrative officials and firefighters when formulating plans in the future.

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